

REMARKS

Claims 1-6, 9, 10, and 12-17 remain pending in this application. All of the pending claims were rejected in the Office action.

I. Claim Rejection Under 35 U.S.C. § 103(a)

Claims 1-6, 9, 10, and 12-17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Haertling (U.S. 5,589,725), Schwartz (U.S. 3,076,903), or Samsel (U.S. 2,756,353) in view of Lange (U.S. 2,814,575) or Harnden (U.S. 4,689,517). Applicant respectfully traverses the rejection.

The rejection rested on the combination of Haertling, Schwartz, or Samsel with Lange or Harnden. It was stated in the Office action that “Harnden, and Lange teach providing a non-conductive coating to prevent electrical arc-over, short circuiting and environmental protection. . . Thus, . . . it would have been obvious to one of ordinary skill in the art to provide a non-conductive coating over all or part of Schwartz, Samsel or Haertling” and that “[l]imiting the insulation to only the edges would be a matter of routine design consideration.” (Office action, page 2.)

Applicant respectfully submits that the art of record, even if properly combinable, does not teach the claimed subject matter. Instead, the art of record teaches away from the claimed subject matter. Specifically, Harnden and Lange teach complete encapsulation of the electrodes of a device in order to prevent arcing (Harnden) and short-circuiting (Lange).

Harnden states that “relays and switches . . . tend to develop excessive arcing . . . across the contacts . . . due to their operation in an ambient air temperature. . . . Operation in air enables prolonged arcing This is due to ionization of the air gaseous medium in the space between the contacts” (Harnden, Column 1, lines 30-47.) Accordingly, Harnden teaches that “it is advantageous to choose an ambient atmosphere such as a vacuum or an inert gas or high dielectric strength atmosphere In such protective vacuum or inert gaseous atmospheres, the gap space between the contacts can attain as high a dielectric as is possible.” (Harnden, Column 2, lines 42-55.) Therefore, “a primary object of [the Harnden] invention is to provide . . . switching devices designed for operation within a vacuum or

protective inert gas atmosphere maintained within [a] protective gastight enclosure containing the . . . switching devices . . .” (Harnden, Column 3, lines 25-30.) Thus, Harnden teaches complete encapsulation of a switching device within a gastight enclosure to prevent arcing. Moreover, Harnden teaches that the enclosure may be fabricated from a conductive metal. (Harnden, Column 17, lines 40-42.)

Lange discloses a method and apparatus for cleaning ampoules. During the method, a transducer having electrodes is submerged within a cleaning fluid, and pressure waves are generated in the fluid by the transducer. (Lange, Column 1, lines 69-72, and Column 3, lines 25-60.) Lange teaches that “[i]n order to prevent the electrodes . . . from being short-circuited by reason of the immersion of the transducer within the fluid . . . , it is preferably completely covered by a suitable insulating material” (Lange, Column 3, lines 54-60.) Thus, Lange also teaches complete encapsulation of electrodes to prevent short-circuiting.

Independent claims 1 and 10 of the present application require, among other things, an “insulating coating” that “does not cover the upper and lower surfaces.” In sharp contrast, Harnden and Lange require complete encapsulation of a device and, therefore, teach away from the claimed subject matter. *See In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984) (finding that the PTO failed to establish a *prima facie* case of obviousness when the cited reference would not function as intended if the PTO’s proposed modification were performed). For example, if the encapsulating material of Harnden were limited “to only the edges”, as proposed in the Office action, maintenance of “a protective gastight enclosure” to prevent arcing would be impossible, and the arc-reduction teachings of Harnden would be futile. Moreover, Harnden teaches that the encapsulating material may be a conductive metal, further distinguishing Harnden from the claimed subject matter of the present application. Finally, it is submitted that there would be no technological motivation for modifying Harnden as proposed in the Office action since Harnden provides an alternative way to prevent arcing.

Similarly, if the insulating material of Lange were limited “to only the edges”, as suggested in the Office action, the short-circuit protection taught by Lange would be futile

because the apparatus of Lange would then fail to protect the disclosed transducer from short-circuiting when it is immersed in the cleaning fluid.

Thus, even if Haertling, Schwartz, and Samsel were properly combinable with Harnden or Lange, the proposed combination would not render the claimed subject matter unpatentable since Hardnen and Lange teach away from the claimed subject matter. Therefore, independent claims 1 and 10 are not rendered obvious by the art of record. Moreover, dependent claims 5-6, 9, and 12-17, which depend from claims 1 and 10, are not rendered obvious by the art of record for the same reasons.

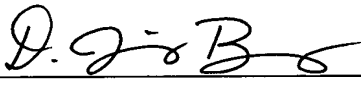
II. Conclusion

It is respectfully submitted that the stated grounds of rejection have been properly traversed. It is therefore urged that the subject application is in condition for allowance, and allowance of the application at issue, upon reconsideration, is respectfully requested. Should the Examiner believe that an interview would facilitate an early disposal of the application, Applicant's undersigned attorney invites a telephone call at the below-listed number.

FEES

No fees are believed to be incurred by this response. Should any fees be deemed necessary, including petition and fee for extensions of time or additional claims, the Commissioner is requested to treat this as such petition, and is hereby authorized to charge any fees due to Caterpillar Inc.'s Deposit Account No. 03-1129.

Respectfully submitted,

 *April 15, 2003*
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EXHIBIT A

Marked Up Copy of Amendments

Title: COATED ELECTROACTIVE BENDER ACTUATOR

Application No. 09/818,308

Attorney Docket No. 99-600

Please amend the specification as indicated below, wherein additions are underlined and deletions are enclosed within brackets.

Please amend the paragraph beginning at page 1, line 25, as set forth below:

One difficulty with using a conventional actuator in a pump or valve is that pumps and valves are commonly made of metal. In a bare electroactive bender actuator, one or more parts of the actuator may accidentally come into electrical contact with the pump or valve causing the actuator to short and malfunction. In order to prevent such shorting, an actuator must be electrically insulated from the structure in which it is located, including the actuator's [actuator=s] clamping apparatus and the load or orifice that the bender pushes against or contacts. For example, when a bender actuates directly against an orifice in order to control a fluid flow, either the actuator or the orifice surface is made non-conducting. For example, U.S. Patent No. 5,079,479 is directed to an actuator having a void on the bender or actuator's [actuator=s] outer electrode. Although this void does insulate the actuator from the orifice seat, it creates an undesirable non-uniform excitation of the electroactive material which can lead to stress concentrators and possible failure. In another example, U.S. Patent No. 4,492,360, the orifice seat is made of insulating plastic. Plastics, however, have undesirable sealing properties such as a low modulus of elasticity and are subject to deformation after many cycles or repetitions. Such deformation is even more apparent when the ultra high performance actuators such as those disclosed in U.S. Patent Nos. 5,471,721 and 5,632,841 are used.